

### **DETAILED ACTION**

Claim 12, 25, 37, 45, and 48 have been cancelled. Claims 1-11, 13-24, 26-36, 38-44, 46, 47 and 49-61 are pending.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-9, 11, 13, 15 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hutton (US 5,277,224) in view of Coleman (US 4,711,268).

Regarding claim 1, Hutton discloses: a pin valve assembly comprising:

- a pin block (labeled as 54 in FIG 3) housing a valve pin (50);
- a fluid plate (the large, hatched member labeled as 33, 34, 36, 40 in FIG 3) with a fluid channel (62, 63, 66) for fluidically communicating with the valve pin;
- a fitting block (30, see FIG 2) housing a fitting (31, 32) for fluidic communication with the fluid plate and for fluidic communication with fluidic components; and
- a pin valve seat (the surface against which the pin valve member closes, at the interface of 62 and 63 as seen in FIG 3) in communication with the fluid channel (62, 66) between a first portion of the fluid channel (62) and a second portion of the fluid

channel (63), the pin valve seat aligned to receive the valve pin (when the valve is closed, as seen in FIG 3).

Hutton does not disclose the valve pin, when closed, to abut an opening in the first portion and an opening in the second portion of the fluid channel, both of which are formed by the valve seat. Coleman teaches that it was known in the art at the time of invention to form a pin valve seat (51) such that a similar valve pin (50), when closed, abuts against an opening in a first portion (53) and an opening in a second portion (leading to passage 16) of a flow channel. To create a redundant, and therefore more robust sealing interface when Hutton's pin valve closes, it would have been obvious to form Hutton's valve seat such that Hutton's valve pin, when closed, seals against both the first and second portions of the flow channel, as taught by Coleman. (As such, the openings would be formed proximal to the outer surface of the fluid plate.)

Regarding claim 2, Hutton discloses: a fitting port (the hole through member 30 which receives member 31, 32), aligned with the fitting (31, 32).

Regarding claim 3, Hutton discloses: the fitting port to be integrated into the fluid channel of the fluid plate (they are connected, just as disclosed in Applicant's invention).

Regarding claim 4, Hutton discloses: the pin valve seat to be integrated into the fluid channel of the fluid plate (it is formed therein, just as in Applicant's invention).

Regarding claim 5, Hutton discloses: the fitting port to be integrated into the fitting (the fitting port receives the fitting, just as in Applicant's invention).

Regarding claim 6, Hutton in view of Coleman discloses: the pin valve seat to be fitted to the valve pin (thus allowing the valve to close).

Regarding claim 7, Hutton discloses: the fitting block to be coupled to the pin block (via the fluid plate) with the fluid plate positioned between the pin block and fitting block (see FIG 2).

Regarding claim 8, Hutton discloses: the fitting block to be coupled to the pin block by a screw connection (the pin block screws into the fluid plate, and the fluid plate couples the pin block to the fitting block).

Regarding claim 9, Hutton discloses the pin valve to house the pin with distal and proximal ends substantially axially disposed within a housing (see the cutaway of valve 48, FIG 3).

Regarding claim 11, Hutton discloses: the valve pin to be actuated by an actuator (51, 52) to provide for a distal end of the valve pin to sit in the pin valve seat substantially sealing the fluid channel (when the valve is closed) and removing the distal

end of the valve pin from the pin valve seat opening the fluid channel (when the valve is open).

Regarding claim 13, Hutton discloses the invention as claimed with exception to the ring seal. However, the use of O-rings was notoriously well-known in the art at the time of invention, and it would have been obvious to use an O-ring within the pin valve housing to prevent the pin valve from leaking.

Regarding claim 15, Hutton discloses: each valve pin is housed in a housing (see FIG 3) comprising an actuator (51, 52, etc.) for axially moving the valve pin to sit on the pin valve seat and substantially block fluid flow from a downstream location or remove the pin from the pin valve seat and provide for fluid flow to the down stream location.

Regarding claim 58, the claimed method would necessarily be performed during the normal and usual provision and operation of Hutton's device as modified by Coleman.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hutton in view of Coleman as applied to claim 1 above, and further in view of Cooper et al. (US 5,713,333)

Hutton discloses the claimed invention except wherein the distal end of the pin has a diamond-like carbon coating. Cooper et al., however, teach the use of amorphous (diamond-like) carbon coatings of moving parts of valves for the purpose of providing low coefficients of friction and high thermal expansion coefficients and high hardness similar to that of ceramics (Col. 8 Lines 3-9). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the pin disclosed by Hutton so that the distal end has a diamond-like carbon coating, as taught by Cooper et al.

Claims 14, 16, 17 and 59-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hutton in view of Coleman as applied to claim 1 above, and further in view of Hauck (US 6,012,487).

Regarding claims 14 and 16, Hutton discloses the claimed invention except wherein the fluidic components are an HPLC system pump syringe, pump, column sample loop and sample syringe. Hauck, however, teaches that a "typical environment" in which such valves are used in an HPLC system with fluidic components including HPLC system pump syringe (Col. 1 Lines 30-32), pump 34, column 42, sample loop 103 and sample syringe 39. Given that the Hauck teaches that an HPLC system pump syringe, pump, column sample loop and sample syringe are a typical HPLC environment, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the fluidic components disclosed by Hutton to comprise an HPLC

system pump syringe, pump, column sample loop and sample syringe, as taught by Hauck, for the purpose of using the fluid delivery system in a liquid chromatography application.

Regarding claim 17, Hutton discloses the claimed invention except for the material from which the components are made. It would have been obvious to one having ordinary skill in the art at the time of invention to form the seals from PEEK, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claims 59-61, the claimed method would necessarily be performed during the normal and usual provision and operation of Hutton's device as modified by Coleman and Hauck.

#### ***Allowable Subject Matter***

Claims 18-24, 26-36, 38-44, 46, 47 and 49-57 are allowed.

#### ***Response to Arguments***

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection. Coleman teaches a valve seat with two openings therein which are simultaneously closed off when contacted by a valve pin,

and this teaching as applied to Hutton would meet all limitations of claim 1 as set forth in the rejection above.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM MCCALISTER whose telephone number is (571)270-1869. The examiner can normally be reached on m-f, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Hepperle can be reached on (571)272-4913. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

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